TRIPLETT

THE MIGHTY MITE VOM

Instruction Manual
Model 310 - VOM
Type 2

With Model 10 AC Amperes Adapter
And Model 101 Line Separation Adapter

MP MASTER

MA26094

INSTRUCTION MANUAL

TRIPLETT
MODEL 310 TYPE 2
HAND-SIZE V-O-M

TRIPLETT CORPORATION
BLUFFTON, OHIO 45817

SAFETY NOTICE

Electricity can be dangerous. Observe good safety practice when making measurements on electrical circuits.

Never touch any exposed energized electrical circuit since contact may cause burns or produce lethal electrical currents.

Before making any measurement with the V. O. M. make sure that the switches and test leads are all in their proper locations for the function and range desired.

Never make a range or a function change in the V. O. M. while connected in or to a live circuit.

When measuring high voltages special additional precautions are necessary. Turn off the power before connecting the test probes. Make sure that any capacitors in the circuit are discharged. If no voltage is present, clip the test probes to the circuit. Arrange the V. O. M. and test leads to be clear of grounds, etc.

Turn on the power, and make your reading. Do not handle or touch the V. O. M., test leads or probes while the power source is on. Turn off the power — observe the meter to see that it has returned to "Zero," before removing the probes from the circuit.

CAUTION — In High Power circuit areas such as distribution transformers, dangerous arcs of explosive nature can occur if the circuit is shorted. A V. O. M. switched to a current or low ohm range, when it should be on a voltage range could be the cause of an explosive short. **Always be sure that the V. O. M. is set up for the correct function and range before attempting any measurement.**

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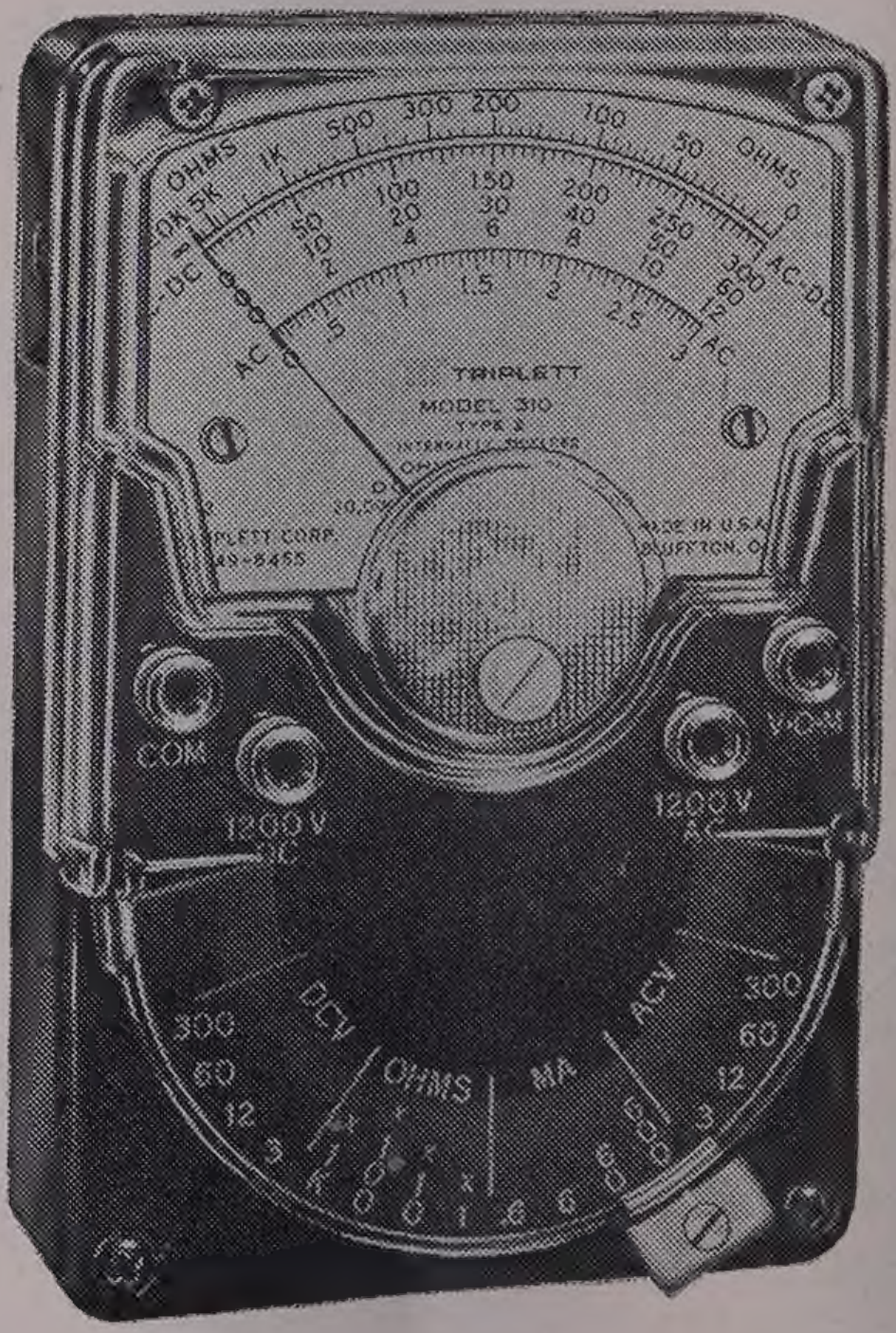
The Mighty Mite VOM



Model 310

DC VOLTS

Ranges:
0-3, 12, 60, 300, 1200 (20,000 ohms per volt)
Accuracy:
± 3% of full scale value

AC VOLTS

0-3, 12, 60, 300, 1200 (5,000 ohms per volt)
Accuracy:
±4% of full scale value (on 60 cycle sine wave at 77°F)

OHMS

Ranges:
0-20,000, 200,000, 2 Meg., 20 Meg.
Accuracy:
± 3% of DC scale with fully charged battery

OHMMETER SPECIFICATIONS

	Range			
	X1	X10	X100	X1K
Max. Voltage (Volts)	1.6	1.6	1.6	18.0
Max. Current (mA)	8.0	.8	.08	.09
Max. Power (mW)	3.2	.32	.032	.605

DC MILLIAMPERES

Ranges:
0-.6, 6, 60, 600 (250 mV)
Accuracy:
± 3% of full scale value

METER

50 uA — 250 mV (Pivot & Jewel)
Meter movement protected by diode module.

SPECIFICATIONS

BATTERIES

One 1.5 volt "N" size (NEDA 910)
One 15 volt Eveready 504 (NEDA 220)

WEIGHT

Approximately 14 oz.

ACCESSORIES supplied with the Model 310

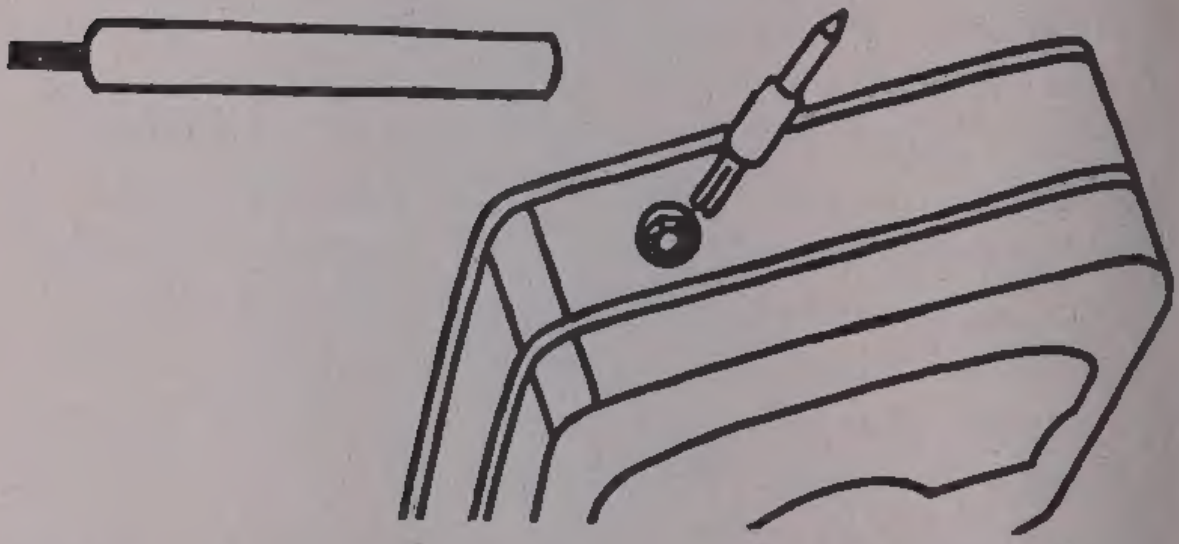
1. One red and one black test lead
2. Alligator clips
3. Batteries: 1 — 1.5V; and 1 — 15V

The Triplett Model 310 is a handy hand-sized V-O-M with all the versatility and performance of larger more expensive bench-size models. It offers diode overload protection against damage to the meter movement caused by accidental overloads. Its rugged, self-shielded, high torque, bar-ring meter movement incorporating springback jewels provides dependable measurement capabilities on the job anywhere — even in strong magnetic fields. Small enough to be carried in your tool box, glove compartment, brief case, or shirt pocket, the Model 310 allows you to have 20,000 ohms per volt DC sensitivity (5,000 Ω/V AC) wherever you need it.

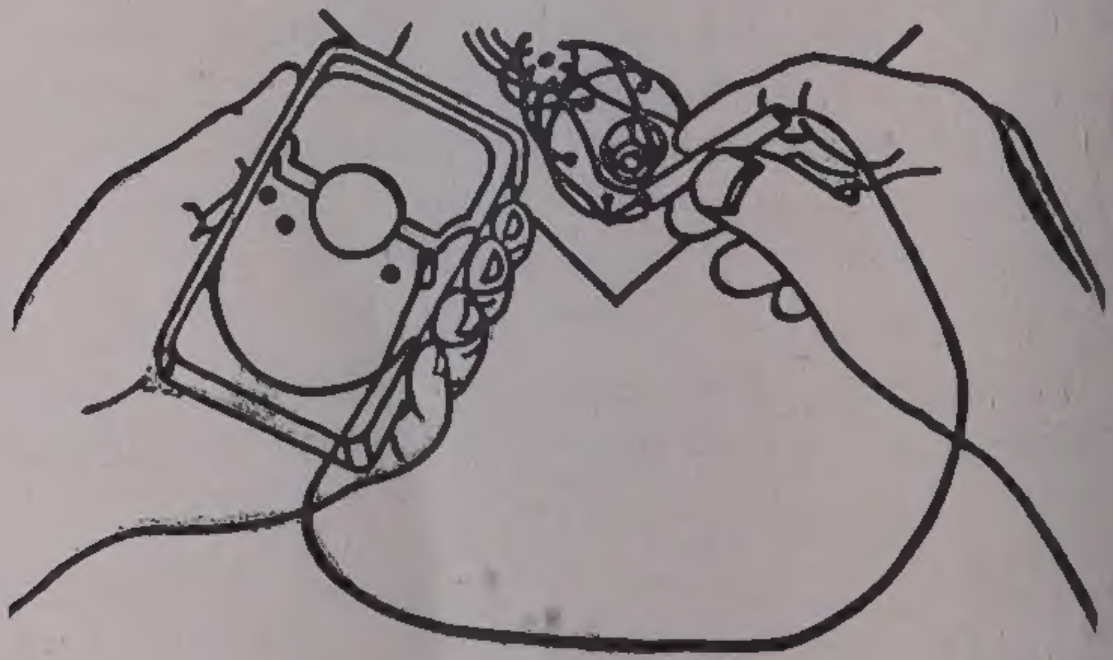
Versatility and readability have not been sacrificed in order to provide a portable V-O-M. The 310 offers 18 different ranges that can all be easily read on only 3 clearly defined scale arcs. A single selector switch allows you to switch easily from range-to-range and function-to-function.

For those hard-to-get-at jobs when you wish you had an extra hand, try this: (Page 8)

Remove tip from the black test lead probe and insert same in end of tester.



By placing tip in the end jack of tester you can hold the tester in your left hand and use the tester as common probe. With test lead connected to V-Ω-M jack the right hand is free to operate other lead as shown in line drawing below. The two leads can be connected together if a long lead is necessary.



CARRYING CASES

MODEL 379 →

Handsome black-leather carrying case with adequate space for Models 310 and 10 in combination without disconnecting the two units. Separate pocket for Model 101. Trouser belt slips through loop on back of the case for out-of-the-way carrying. Strong leather strap handle. Space in lid for leads.

Part No. 10B - 1456

← MODEL 369

Same as above, but for Model 310 only, and proportionally smaller in size.

Part No. T-10-1258

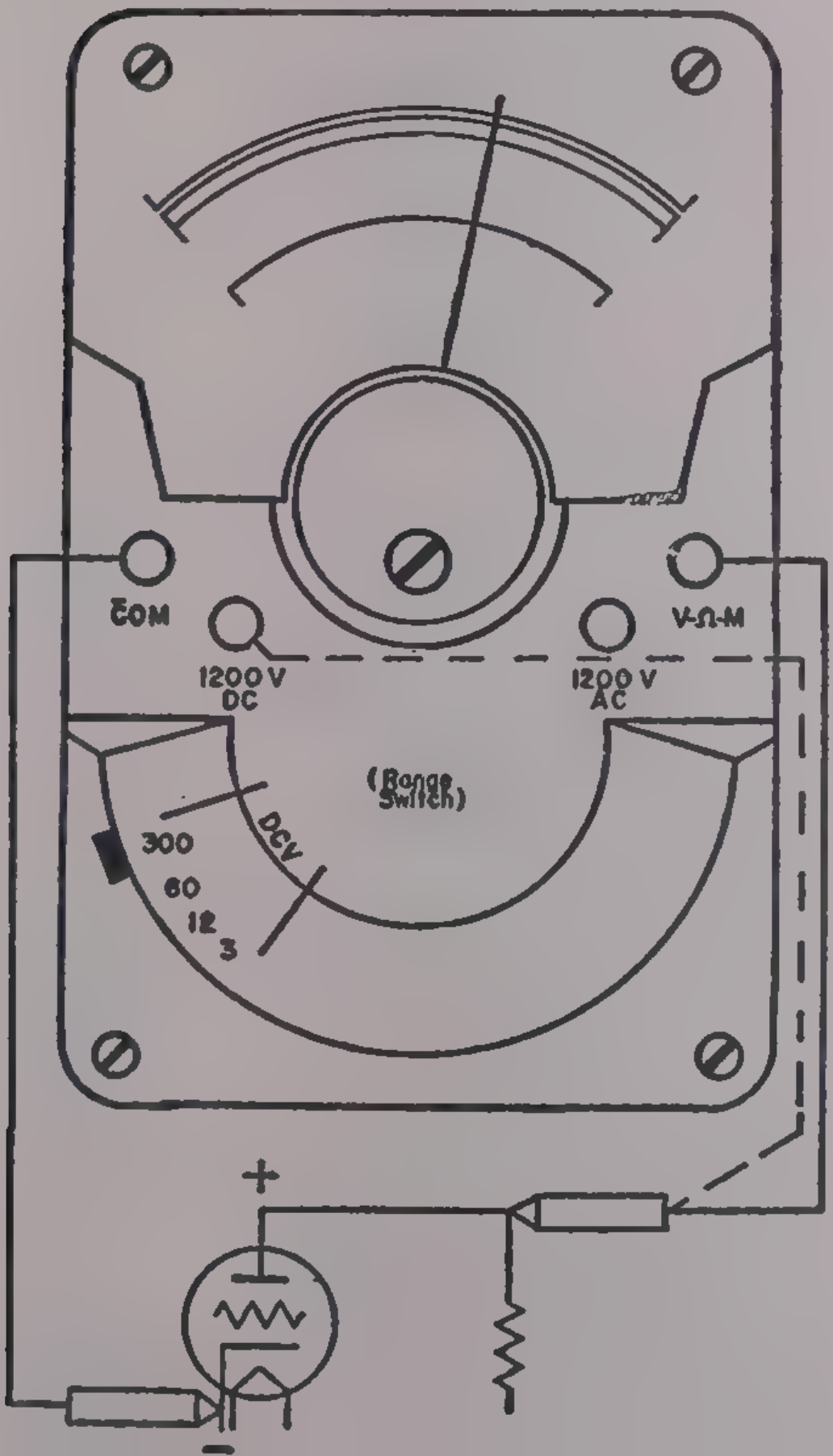
DC Voltage Measurements

Five DC Volt ranges are available, namely 0-3, 12, 60, 300 and 1200.

Read all DC volts on Black Scale. The 0-3 Volt range is read on the 0-300 scale dividing the reading by 100, i. e., if the meter reads 250 this would equal 2.50 volts. The 0-12, 0-60, and 0-300 ranges are read direct on corresponding scales. The 0-1200 range is read on the 0-12 scale by adding two zeros to the reading; i. e., the meter reading 8 would equal 800 volts.

Place range switch lever in range position you intend to use. Always start with the highest range if in doubt as to the approximate voltage.

Connect black test lead to "COM" jack and red test lead to "V-Ω-M" jack when reading is on 3, 12, 60 and 300 ranges. To use the 1200 Volt range connect the red test lead to 1200V DC jack and set switch to 300 DCV position.


COM
V-Ω-M
1200 V DC
1200 V AC
(Range Switch)
DCV
300
60
12
3
+
−

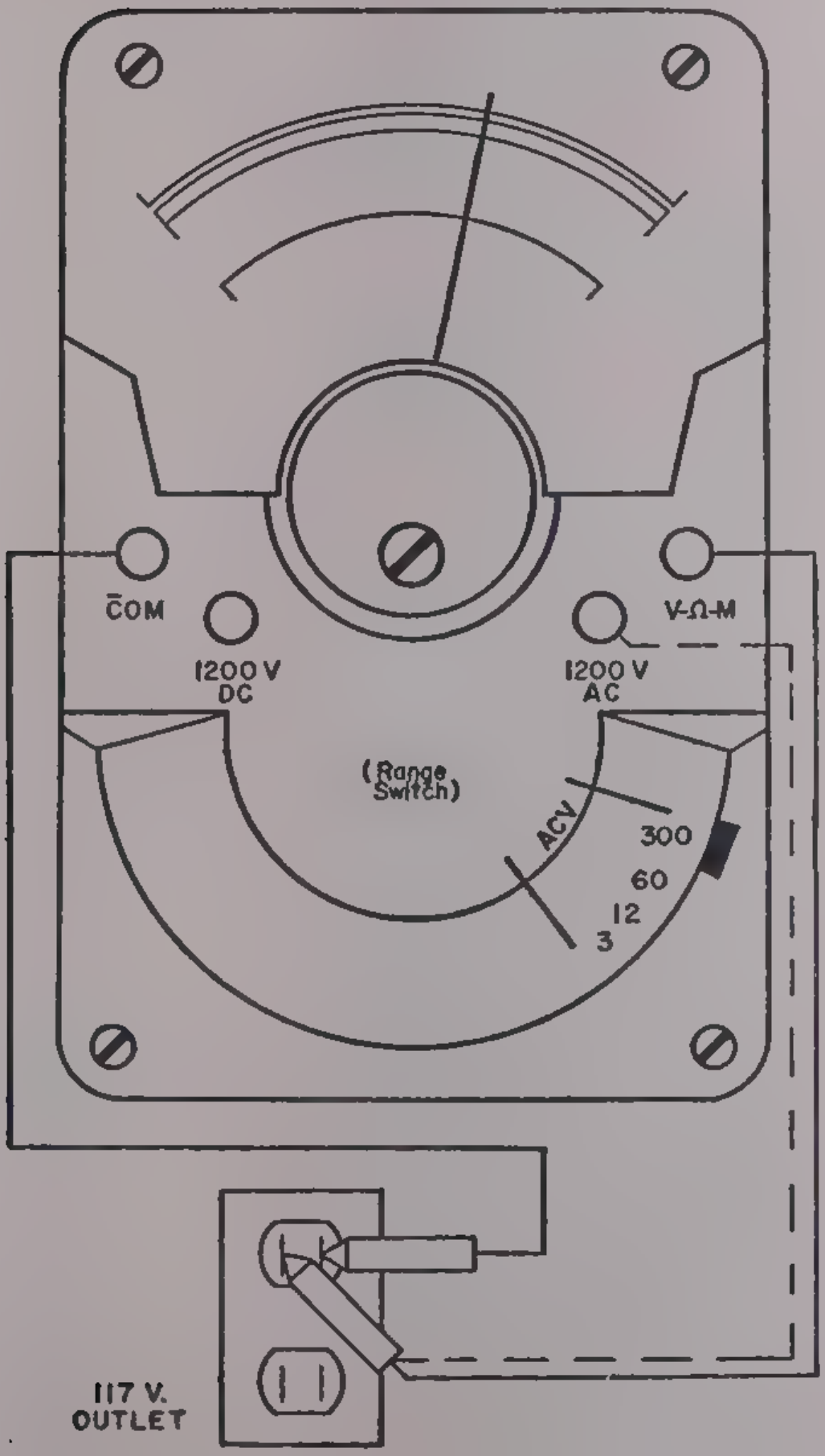
AC Voltage Measurements

Five AC Volt ranges are available, namely 0-3, 12, 60, 300 and 1200.

Read all AC Volts on Red scales. For greater accuracy a separate scale is provided for 0-3 Volts. The 0-12, 0-60, and 300 ranges are read direct on corresponding scales. The 0-1200 range is read on the 0-12 scale by adding two zeros to the reading, i. e., the meter reading 8 would equal 800 volts.

Place range switch lever in range position you intend to use. Always start with the highest range if in doubt as to the approximate voltage.

Connect black test lead to "COM" jack and red test lead to "V-Ω-M" jack when reading on 0-3, 12, 60 and 300 ranges. To use the 1200 AC Volt range connect the red test lead to 1200V AC jack and set switch to 300 ACV position.


COM
1200 V DC
1200 V AC
V-Ω-M
(Range Switch)
ACV
300
60
12
3
117 V. OUTLET

DC Resistance Measurements

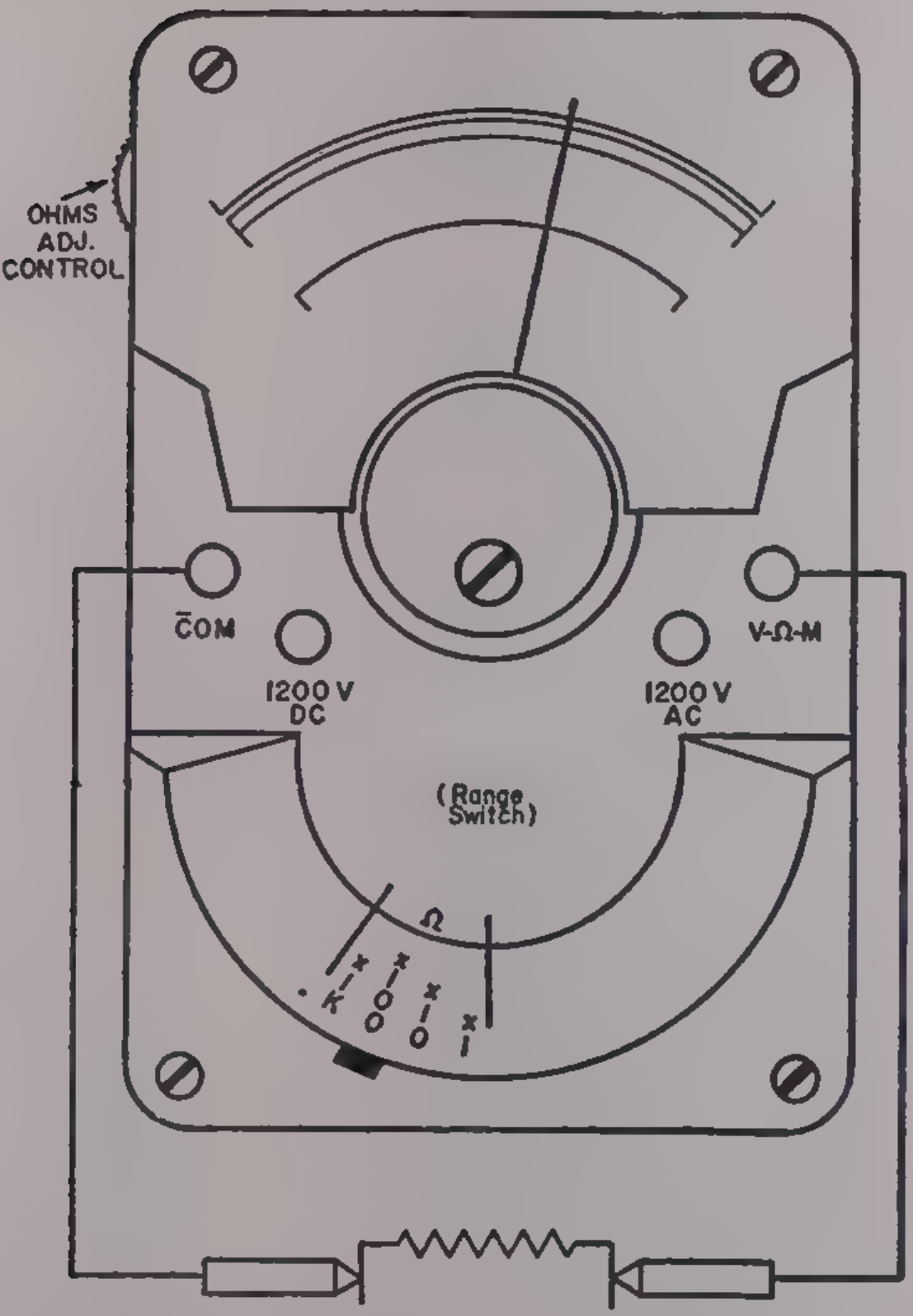
Four resistance ranges are available, namely, 0-20,000, 0-200,000, 0-2 Meg. and 0-20 Meg.

To make resistance measurements connect black test lead to "COM" jack and red test lead to "V-Ω-M" jack.

Place range switch lever in range position you intend to use. Short test leads together and adjust "Ohms adjust" control so the pointer will rest on "0" of the ohms scale which is on the right hand side of the meter.

All four ohm ranges may be used without changing positions of the test leads.

Do not touch any metal parts of the circuit when using the high ohm ranges. It is not dangerous but your body resistance can cause serious error in reading.


OHMS
ADJ.
CONTROL
COM
1200 V
DC
1200 V
AC
V-Ω-M
(Range
Switch)
Ω
K
x
100
x
10
x
1

DC Current Measurements

Four DC current ranges are available, namely, 0-.6 Mil. or 0-600 Microamperes, 0-6 Mil., 0-60 Mil. and 0-600 Mil.

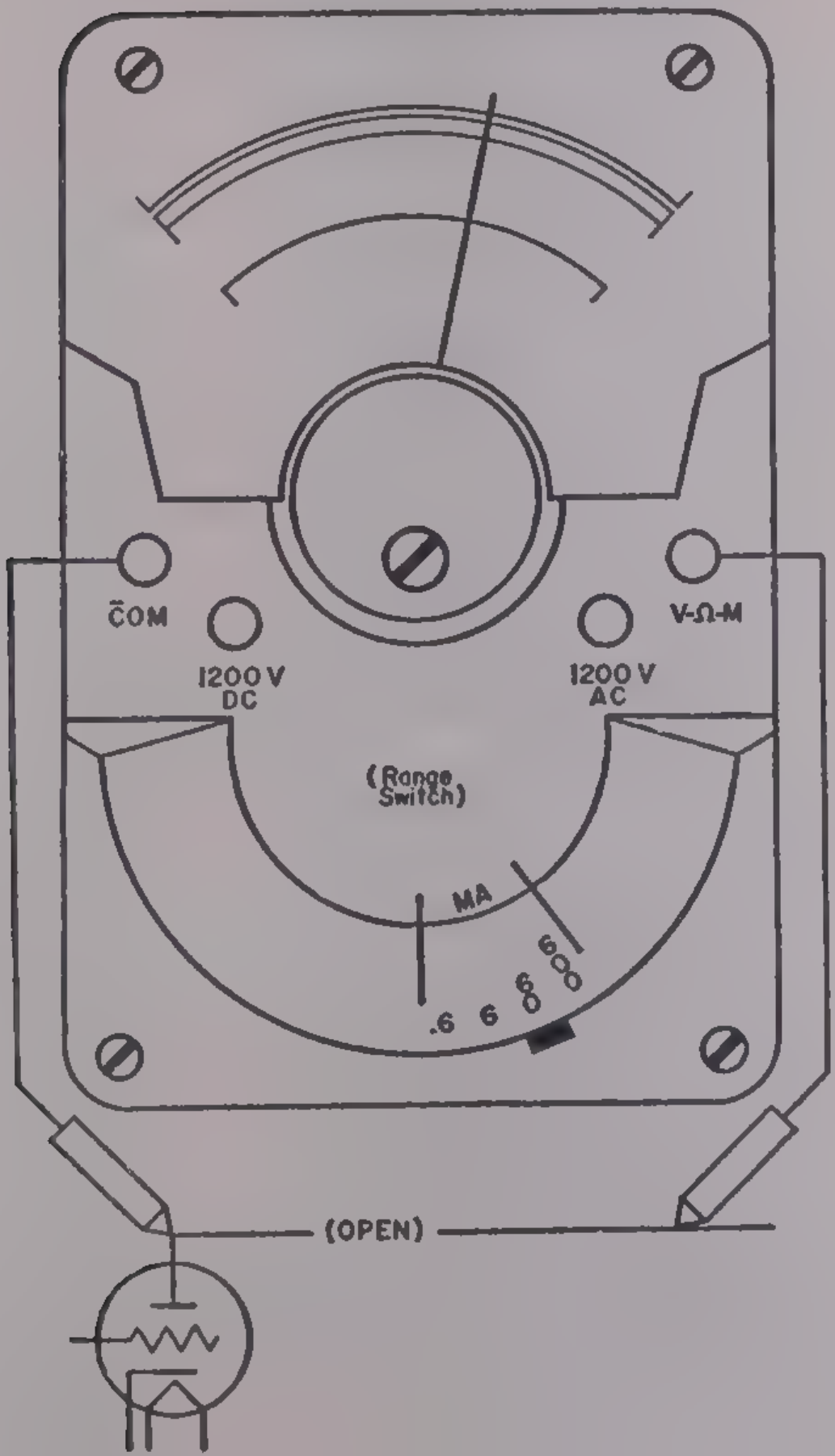
All four ranges are read on the 0-60 scale.

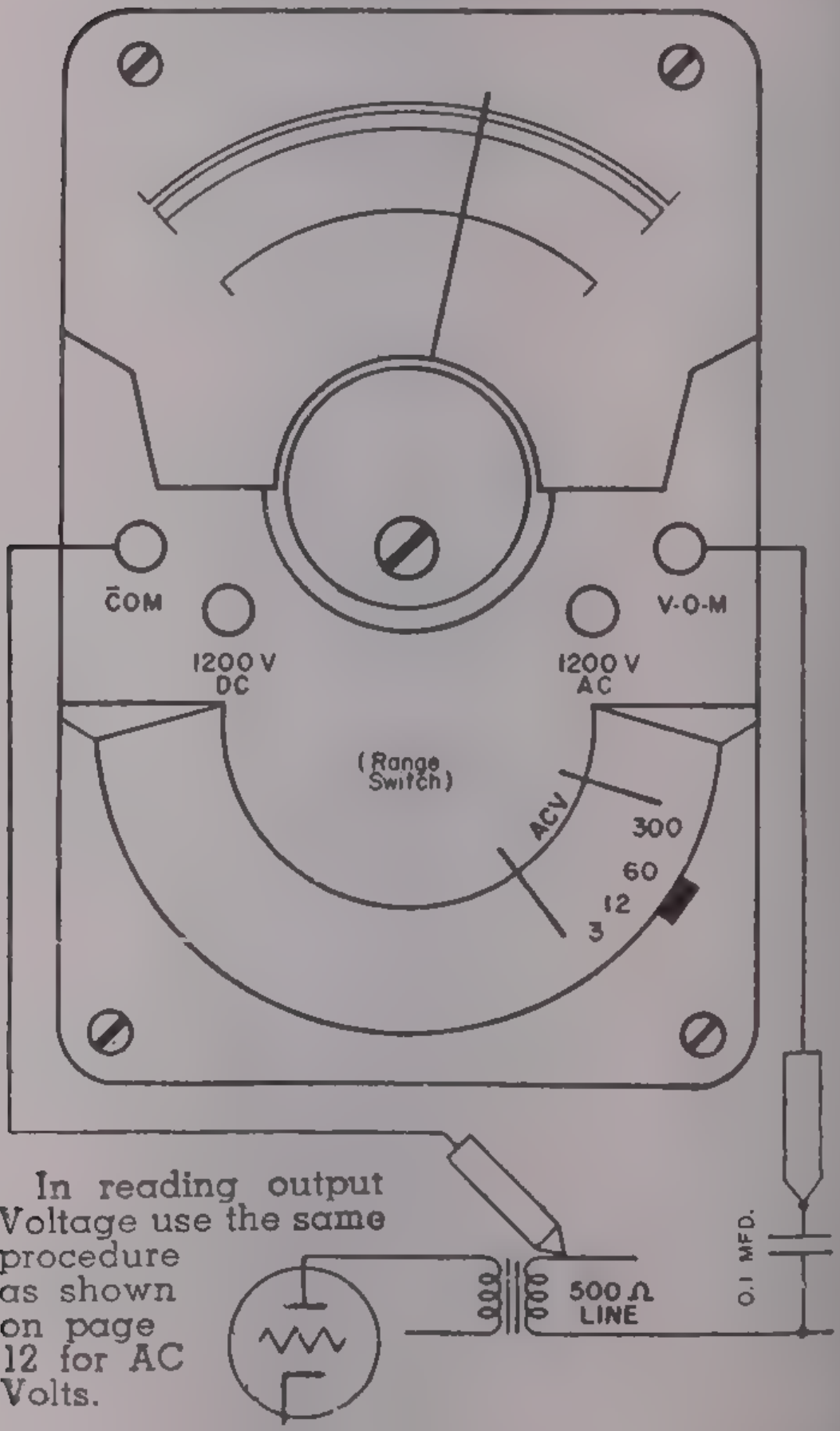
On the 0-.6 range divide the reading by 100, 0-6 divide the reading by 10, 0-60 read the scale direct, and 0-600 multiply the reading by 10 or add one zero to reading.

All current measurements are made with the test leads in the same jacks. The black lead in the jack marked "COM" and the red lead in the jack marked "V-Ω-M."

Place range switch lever in range position you intend to use.

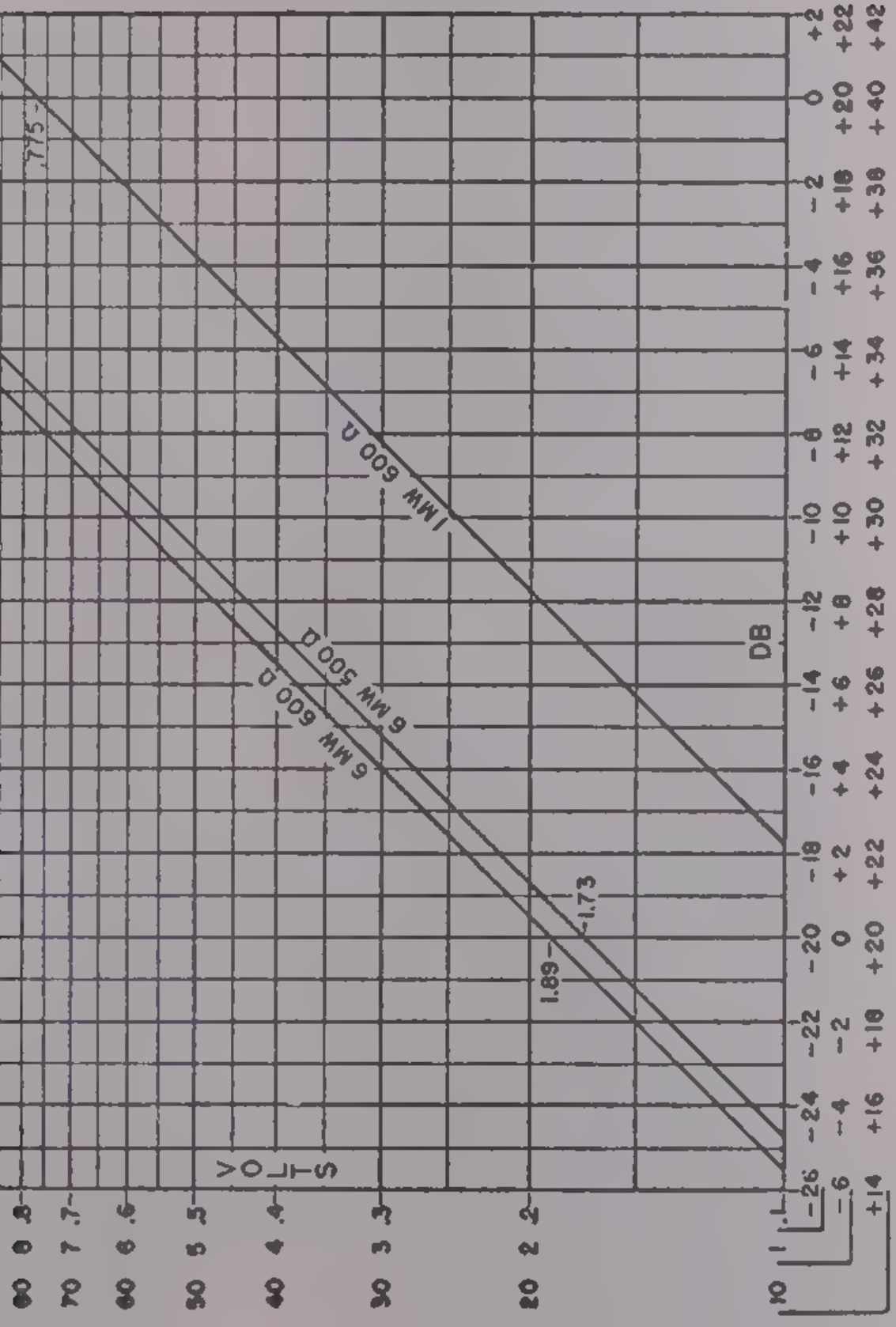
Connect the test probe in series with the circuit to be measured. Do not test directly across any potential circuit as this may burn out the instrument and shunt. The red lead is positive. Where polarity is difficult to determine the meter may read backwards. No damage will be done if this occurs. Simply reverse the leads.


COM
1200 V DC
1200 V AC
V-Ω-M
(Range Switch)
MA
.6
6
60
600
(OPEN)



In reading output Voltage use the same procedure as shown on page 12 for AC Volts.

Measuring Output Volts (DB)



To Measure	Set Range Switch	Leads Conn Black Lead Red Lead
DC Volts		
0-3	DCV 3	V-Ω-M
0-12	DCV 12	V-Ω-M
0-60	DCV 60	V-Ω-M
0-300	DCV 300	V-Ω-M
0-1200	DCV 300	1200
AC Volts		
0-3	ACV 3	V-Ω-M
0-12	ACV 12	V-Ω-M
0-60	ACV 60	V-Ω-M
0-300	ACV 300	V-Ω-M
0-1200	ACV 300	1200
OHMS		
0-20,000	Ω X1	V-Ω-M
0-200,000	Ω X10	V-Ω-M
0-2 Meg.	Ω X100	V-Ω-M
0-20 Meg.	Ω X1K	V-Ω-M
DC Mil.		
0-.6	MA .6	V-Ω-M
0-6	MA 6	V-Ω-M
0-60	MA 60	V-Ω-M
0-600	MA 600	V-Ω-M

ns M" Below	Read on Scale	Each Scale Div. Equals
	300÷100	.05 Volt
	12	.20 Volt
	60	1 Volt
	300	5 Volt
	12x100	20 Volt
	3 AC	.05 Volt
	12	.20 Volt
	60	1 Volt
	300	5 Volt
	12x100	20 Volt
	0-20K	
	0-20Kx10	
	0-20Kx100	
	0-20Kx1000	
	60÷100	.01 Mil.
	60÷10	.1 Mil.
	60	1 Mil.
	60x10	10 Mil.

Pointer Zero Adjust

From time to time it may be necessary to adjust the pointer so it will rest on "0". This can be done with a small screwdriver placed in the adjusting screw located on the front panel of the tester.

Replacing Batteries

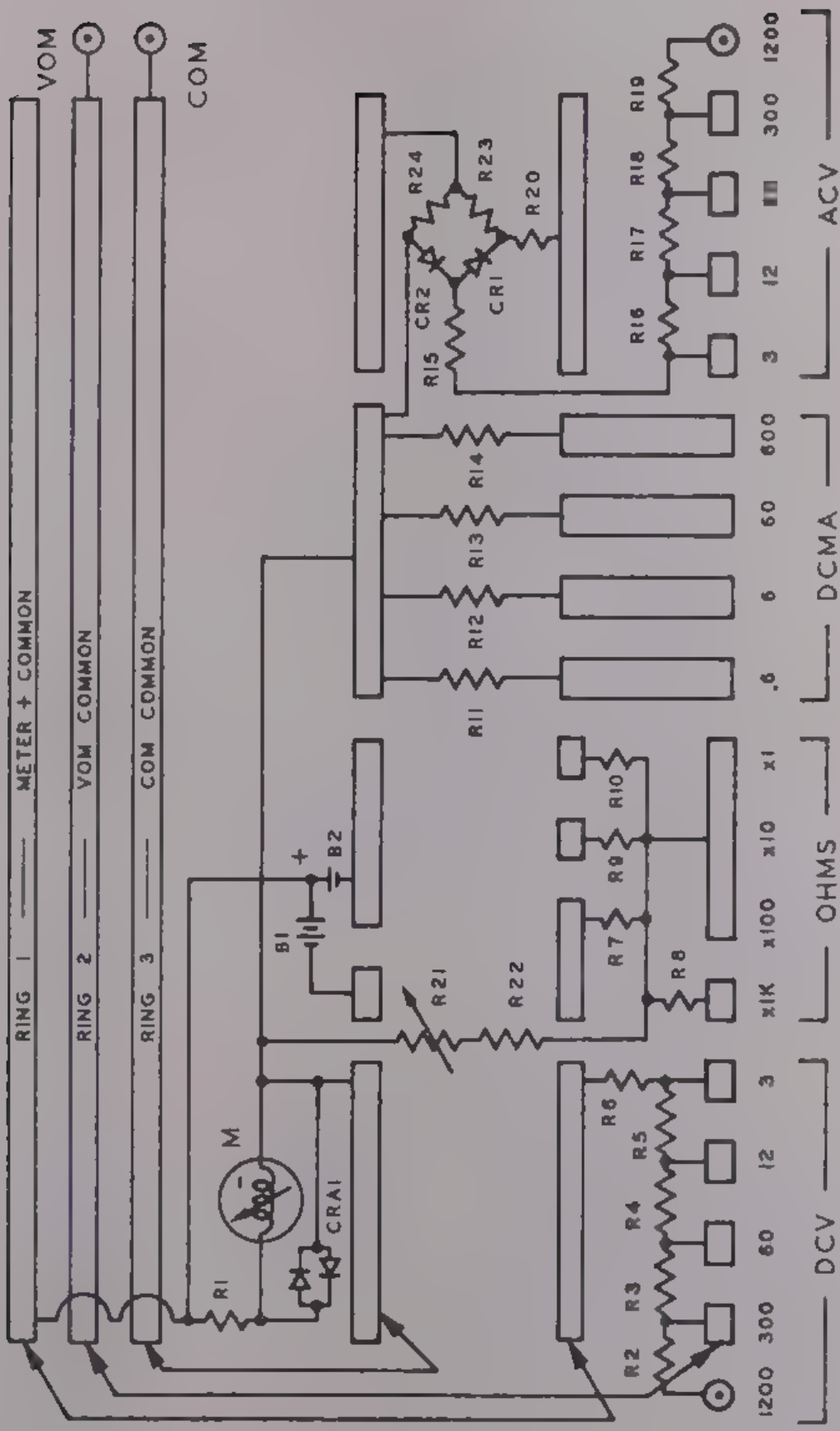
When the ohm ranges X1, X10 and X100 will not zero with the ohms adjust control the 1.5V battery should be replaced. If the X1K range will not zero then replace the 15 Volt battery. To replace either battery remove the small panel on back of the tester. Watch polarity when replacing batteries.

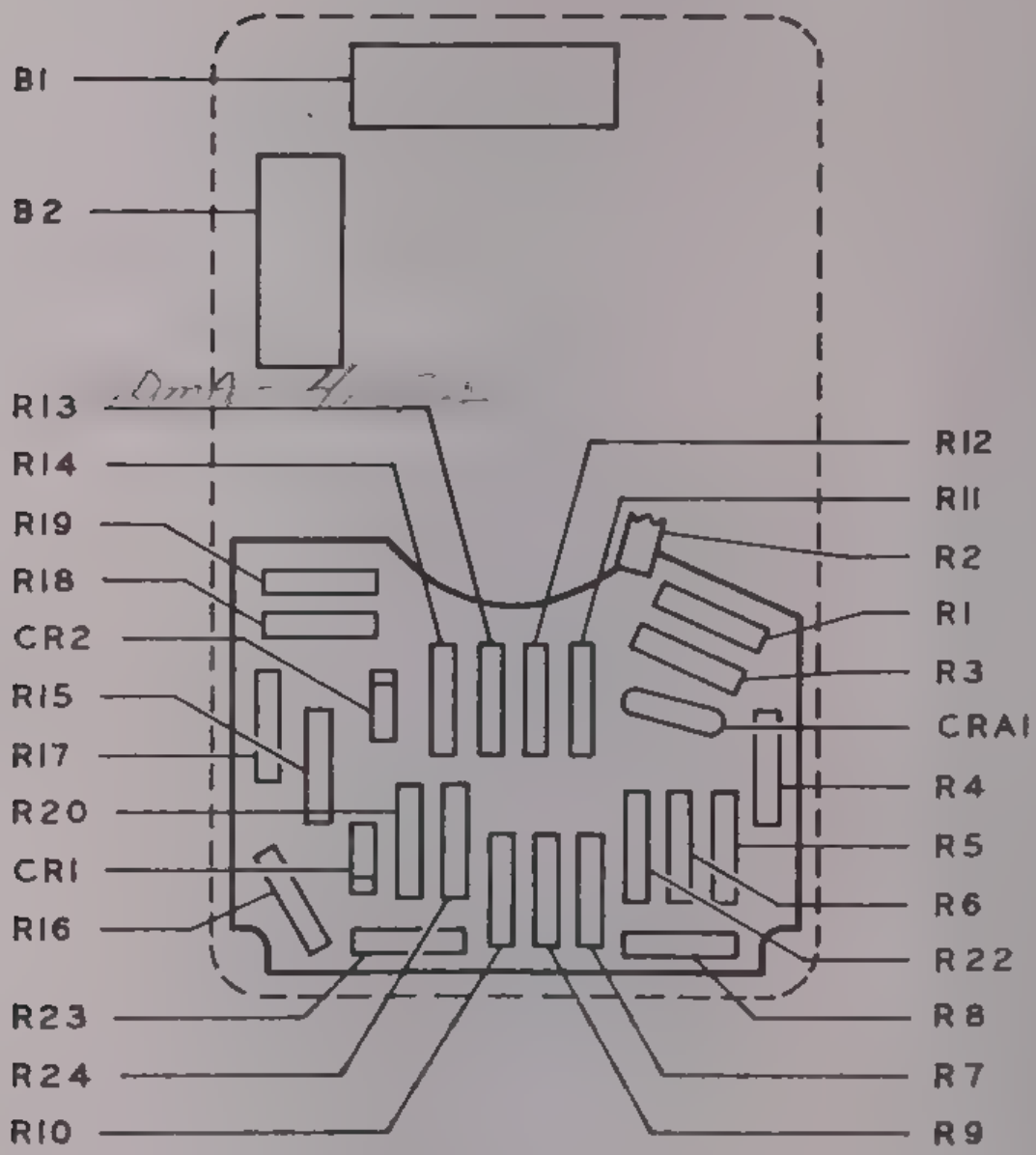
For longer life the 1.5 volt battery can be replaced with mercury type Mallory RM401, Eveready E-401, or Burgess HG-401.

Cleaning Plastic Window

The plastic window has been treated at the factory to dissipate static charges. If cleaning is necessary, use cotton dipped in a solution of common household detergent and water. After cleaning, allow the solution to dry without rubbing; the resultant detergent film will effectively dissipate static charges.

CAUTION: Solvents and liquids used in radio and TV shop work may craze or scar the plastic window if applied to it.


VOM
COM
RING 1 —— METER + COMMON
RING 2 —— VOM COMMON
RING 3 —— COM COMMON
B1
B2
M
CRA1
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
R17
R18
R19
R20
R21
R22
R23
R24
CR1
CR2
DCV
OHMS
DCMA
ACV
1200 300 60 12 3
x1K x100 x10 x1
.6 6 60 600
3 12 300 1200



If the VOM has not been used for a long period of time, rotate the selector switch in both directions several times to wipe the switch contacts for good contact.

REPLACEABLE PARTS LIST MODEL 310 TYPE 2

Circuit Symbol	Part Number	Qty. Used	Description
M	52-4187	1	Instrument assembly, pivot & jewel (50 uA 250 mV)
	10-1256	1	Front assembly
	41-3117	1	Base assembly
	10877	1	Battery plate cover
	2432-2-4	4	Screw, battery plate cover
	46-32	1	Contact, battery 1.5V negative
	46-33	1	Contact, battery 15V negative
	46-89	1	Contact, battery positive
	2434-2-3	1	Screw, battery contact retaining
	147-32	1	Lockwasher, battery contact retaining

REPLACEABLE PARTS LIST MODEL 310 TYPE 2

Circuit Symbol	Part Number	Qty. Used	Description
	10880	1	Switch lever assembly
B1	37-22	1	Battery 15 volt (NEDA 220)
B2	37-21	1	Battery 1.5 volt (NEDA 910-F)
	87-249	1	P..C. Board with components
	87-250	1	P.C. Board less components
R1		1	Resistor, (Value may vary from 2300 to 3250Ω)
R2	15-2593	1	Resistor 18 Meg. 1% 1 watt
R3	15-2436	1	Resistor 4.8 Meg. 1% ½ watt
R4	15K-9603TB4	1	Resistor 960KΩ 1% ¼ watt
R5,R8	15K-1803TA3	2	Resistor 180KΩ 1% ⅛ watt
R6,R7	15K-5502TA3	2	Resistor 55KΩ 1% ⅛ watt
R9	15K-2201TB4	1	Resistor 2.2KΩ 1% ⅛ watt
R10	15-2595	1	Resistor 200Ω 1% 1 watt
R11	15-2596	1	Resistor 455Ω 1% 1 watt
R12	15K-420FUB4	1	Resistor 42Ω ½% ¼ watt
R13	15-3496	1	Resistor 4.17Ω ½% 150 mA
R14	15-3647	1	Resistor .415Ω ¼% 800 mA
R15		1	Resistor (Value may vary from 10.5K to 10.7K)

R16	15K-4502TA3	1	Resistor 45KΩ 1% 1/8 watt
R17	15K-2403TA3	1	Resistor 240KΩ 1% 1/8 watt
R18	15K-1204TB4	1	Resistor 1.2M 1% 1/4 watt
R19	15-4986	1	Resistor 4.5M 1% 1/2 watt
R20		1	Resistor (Value may vary from 2.4K to 2.7K)
R21	16-31	1	Resistor, Variable 20KΩ
	65-405	1	Bracket, R21 retaining
	5168	2	Lockwasher, R21 to bracket
	27-83	2	Nut, R21 to bracket
	32-5C	1	Terminal, R21 to circuit
	2434-2-6	1	Screw, R21 bracket & terminal
	5168	1	Lockwasher, R21 bracket & terminal
R22	15K-1502TA3	1	Resistor 15KΩ 1% 1/8 watt
R23,R24	15K-5001TA3	2	Resistor 5KΩ 1% 1/8 watt
CR1,CR2	11056	2	Diode
CRA1	11670	1	Diode assembly
	79-153	1	Test leads, needle point
	79-296	1	Test leads, blunt point
	2567-56	1	Tip, double end (ground lead)

NOTES

MODEL 10
ADAPTER

MODEL 10
INSTRUCTIONS

HOW TO USE YOUR TRIPLETT MODEL 10 AC CLAMP AMMETER ADAPTER

In connection with the Triplett Model 310 Volt-Ohm-Milliammeter

General Information

This instrument will measure AC current by clamping the jaws around a single conductor when the test lead is plugged in the VOM jack of the Model 310 VOM.

The Model 10 may be used in conjunction with any VOM having a 3 volt AC scale at a minimum sensitivity of 5000 ohms per volt (such as Triplett Models 630, 630A, 630PL, 630NS, 631, etc.). The No. 611 leads are required to connect the Model 10 to the VOM.

Accuracy:

All resistors and shunts used in Models 10 and 310 are ±1%. The Meter DC accuracy is ±2%; ACV accuracy ±4% of full scale. Best accuracy is obtained on AC Amperes by holding the single wire conductor in the center of the jaws.

GENERAL INSTRUCTIONS

INSTRUCTIONS:

(1) Attach the Model 10 to Model 310 by rotating lever 90° toward red lead on Model 10. Insert Model 10 in 310 as shown in Figure 1. Then rotate lever 90°

toward common connection securing Model 10 in place.

(2) Plug the red colored test lead attached to Model 10 into the VOM jack of Model 310.

If desired, the Model 310 may be used as a separate tester (leaving the Model 10 attached) simply by removing the red lead from the VOM jack. A hole is provided in the front panel of Model 10 to receive the plug on the lead wire when not in use (Fig. 2).

(3) Set the selector switch on Model 310 VOM at the 3 AC Volt position.

This switch must remain in the 3 AC Volt position for all AC Ampere tests and all readings are made on the 0-3 AC scale expressed in amps. (Table 1).

(4) Set the switch of the Model 10 adapter to the highest AC ampere range. Press lever to open jaws. Place jaws around one of the conductors. (Do not test around twin or multiple conductors or wires with shielding), release lever to close jaws and read meter. (Fig. 3)

(5) Reset range switch on Model 10 providing greatest pointer deflection. When reading is below the half scale on the lowest range (6 amperes) greater accuracy may be had by wrapping the conductor twice around the jaws. The correct reading thus would be divided by two. (Fig. 4). If three turns then divide by three, etc.

No. 311 Leads:

The Model 10 can be separated from the Model 310 by using No. 311 lead attachment. This permits reading in difficult locations.

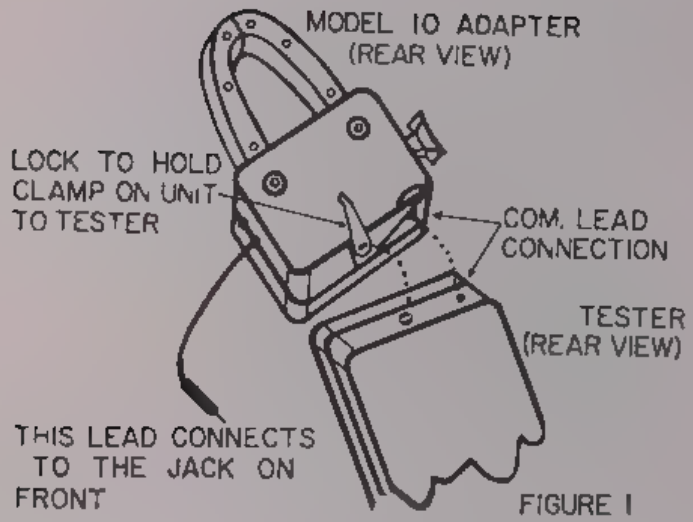


FIGURE 1

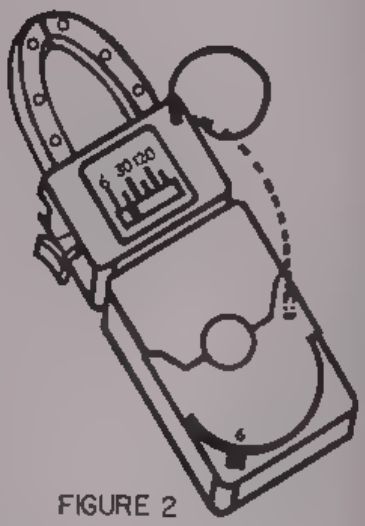


FIGURE 2

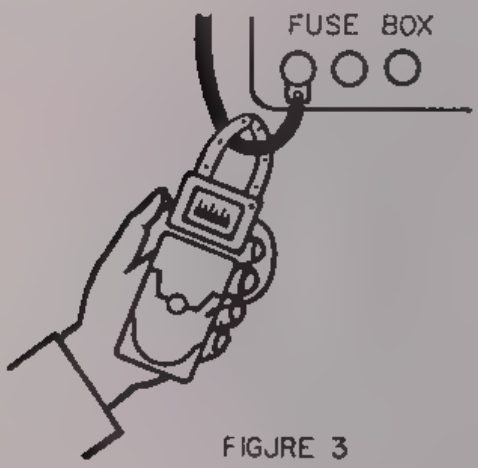


FIGURE 3

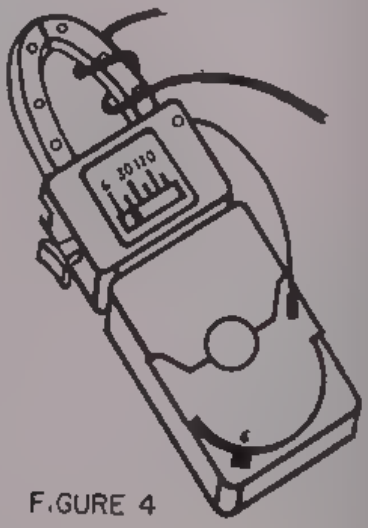


FIGURE 4

Model 10 Setting A. C. Amperes	Set Range Switch Model 310	Multiply 3 A. C. Volt Scale Reading on 310 by
6	ACV 3	2
12	ACV 3	4
30	ACV 3	10
60	ACV 3	20
120	ACV 3	40
300	ACV 3	100

Caution: The model is designed for use with 3 A. C. Volt range only.

Table 1

Care:

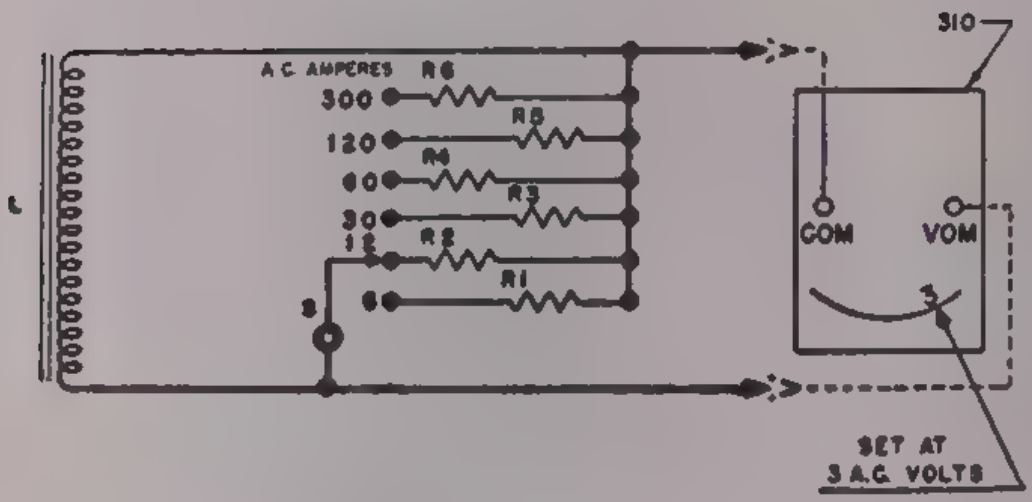
The jaw surfaces should be kept clean. If film appears, clamp a very fine grade of sandpaper between the jaws and pull through.

REPAIR OR SERVICE

In the event repair or service is required, please outline the nature of the difficulty. By providing this information, Triplett can supply more efficient service.

CIRCUIT DIAGRAM

MODEL 10 ADAPTER



REPLACEABLE PARTS

MODEL 10

Ref. No.	Part Name Req.	Description	Part No.
R1	1 Resistor	3800 ohm, film type	15-3882
R2	1 Resistor	1190 ohm, film type	15-3881
R3	1 Resistor	415 ohm, film type	15-3880
R4	1 Resistor	193 ohm, film type	15-3879
R5	1 Resistor	94 ohm, film type	15-3878
R6	1 Resistor	39 ohm, film type	15-3877
	1 Coil	Coil Assemb.	2542A-118
	1 Core	Stationary	64A-47
	1 Core	Moveable	64A-46
	1 Case	Front	10B-1399
	1 Case	Back Assemb.	10-1489
	1 Switch	Switch Assem. Slide	22-297
	1 Board	Printed Circuit	87A-59
	1 Case	Front and Back	10-1497

INSTRUCTIONS MODEL 101

HOW TO USE YOUR TRIPLETT MODEL 101 LINE SEPARATION ADAPTER WITH THE TRIPLETT MODEL 310 OR 310-C V-O-M AND MODEL 10 OR 10-C AC CLAMP-ON AMMETER ADAPTER

GENERAL INFORMATION:

This adapter is used to divide the two-conductor cord so that AC current measurements can be made on equipment with a standard line cord.

It will increase sensitivity and ranges of the Model 310-Model 10 or Model 310-C-Model 10-C combination by 10 times and 20 times. Also the adapter has provisions for voltmeter prods for voltage measurements.

Uses For Model 101 (with 310-10 combination V-O-M, clamp-on ammeter).

Current Capacity of Model 101

Range	Max. Capacity Amperes
Direct	30
Divide by 10	12
Divide by 20	6

INSTRUCTIONS:

Direct Range

For current readings to 30 amperes, on equipment having two-conductor line cords.

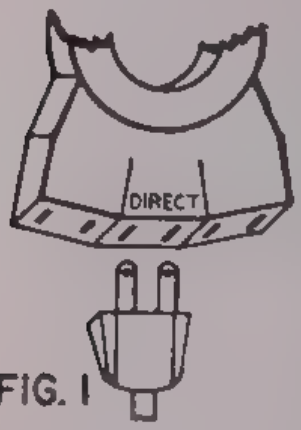


FIG. 1

(1) Plug line cord of appliance or apparatus to be measured into the "Direct" outlet of the Model 101. (Fig. 1).

Plug Model 101 into wall outlet.

(2) With Model 10 adapter and Model 310 V-O-M connected set the selector switch on Model 310 at 3AC Volt position snap Model 10 through the hole in Model 101 and take readings, starting at the highest current range. (Fig. 2). Reset range switch on Model 10 for greatest pointer deflection. (Table 1).

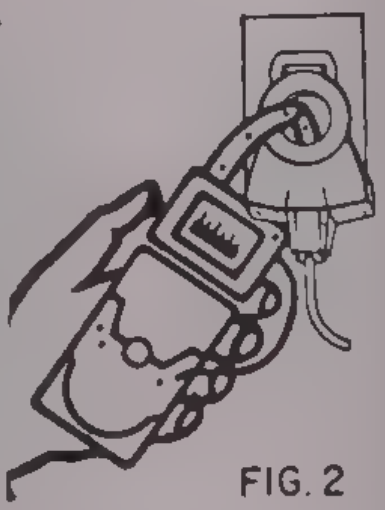


FIG. 2

Divide By 10 Range

To increase the sensitivity of your Model 10 Adapter 10 times.

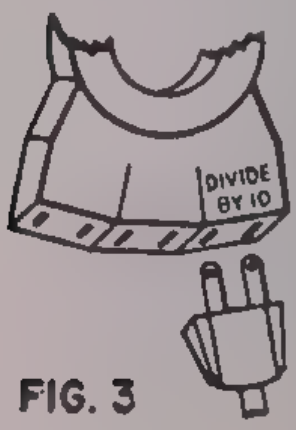


FIG. 3

(1) Plug line cord of appliance or apparatus to be measured into the "DIVIDE BY 10" outlet of Model 101, (Fig. 3).

(2) With Model 101 plugged into wall outlet, snap Model 10 through Model 101 —take reading and divide by 10. (Table 2).

Divide By 20 Range

To increase the sensitivity of your Model 10 Adapter 20 times.

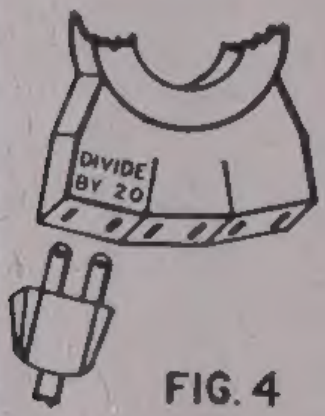


FIG. 4

(1) Plug line cord of appliance or apparatus to be measured into the "DIVIDE BY 20" outlet of Model 101, (Fig. 4).

(2) With Model 101 plugged into wall outlet, snap Model 10 through Model 101 —take reading and divide by 20, (Table 3).

Table 1 Direct Range

Model 10 setting AC Amperes	Multiply 3 AC scale reading on 310 by	Full scale reading in AC Amps (Read on 3 AC scale of 310)
30	10	30
12	4	12
6	2	6

Table 2 Divide by 10 Range

Model 10 setting AC Amperes	Multiply 3 AC scale reading on 310 by	Full scale reading in AC Amps (Read on 3 AC scale of 310)
120	4.0	12.0
60	2.0	6.0
30	1.0	3.0
12	.4	1.2
6	.2	.6

Table 3 Divide by 20 Range

Model 10 setting AC Amperes	Multiply 3 AC scale reading on 310 by	Full scale reading in AC Amps (Read on 3 AC scale of 310)
120	2.0	6.0
60	1.0	3.0
30	.5	1.5
12	.2	.6
6	.1	.3

Note:

(1) Never leave the Model 101 in a circuit carrying more than the capacity rating of the Model 101.

(2) Motors draw a surge current while starting. Therefore, the Model 10 should be set on a high range to avoid overloading the meter when motor starts.

LINE VOLTAGE MEASUREMENTS:

To make line voltage measurements, be sure to remove the Model 10 lead from the V-O-M jack of the 310, and set range switch to 300 ACV range. This lead can conveniently be placed in the hole in the upper right corner of the Model 10. Use the regular test leads for the 310 and measure line voltage at any unused outlet on the Model 101 adapter. This voltage measurement can then be made while the appliance is under load conditions. (Fig. 5).

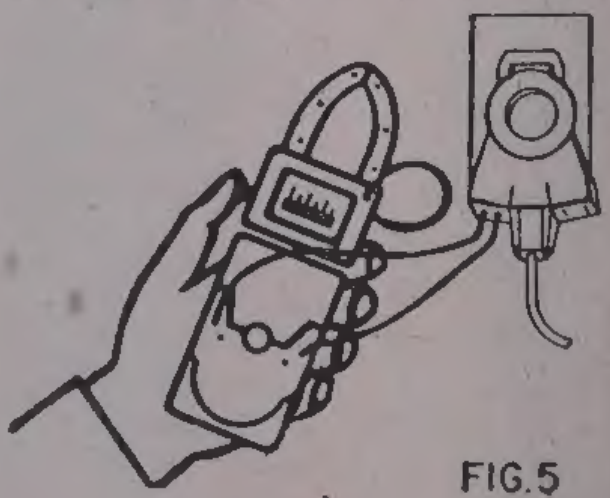


FIG.5

TRIPLETT WARRANTY AND CONDITIONS OF SALE

The Triplett Corporation warrants instruments manufactured by it to be free from defective material or factory workmanship and agrees to repair or replace such instruments which under normal use and service, disclose the defect to be the fault of our manufacturing. Our obligation under this warranty is limited to repairing or replacing any instrument or test equipment which proves to be defective, when returned to us transportation prepaid, within ninety (90) days from the date of original purchase.

This warranty does not apply to any of our products which have been repaired or altered by unauthorized persons or service stations in any way so as, in our judgment, to injure their stability or reliability or which have been subject to misuse, negligence, or accident, or which have had the serial number altered, effaced, or removed. Neither does this warranty apply to any of our products which have been connected, installed, or adjusted otherwise than in accordance with the instructions furnished by us. Accessories including all vacuum tubes and batteries not of our manufacture used with this product are not covered by this warranty.

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